Fatigue Life Prediction Using Simplified Endurance Function Model

M. Kamal, M. M. Rahman, and M. S. M. Sani

Faculty of Mechanical Engineering, Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia
Correspondence should be addressed to M. M. Rahman; mustafizur@ump.edu.my

Academic Editor: Sheng-yong Chen

Abstract
A methodology is proposed to apply an endurance function model with a genetic algorithm to estimate the fatigue life of notched or smooth components. The endurance function model is based on stress tensor invariants and deviatoric stress invariants. In the proposed methodology, FEA is used to simplify the application of the endurance function model. Experimental results from published literature are considered for the case studies to evaluate the proposed methodology. The results show that the proposed methodology simplified the application of the endurance function model, particularly by reducing the need for notch sensitivity factors, and the stress invariants can be calculated directly from the stresses at the critical point. The comparison with experimental results shows that, with proper calibration, the model can predict fatigue life accurately.

Keywords : Endurance Function Model, genetic algorithm, fatigue life

http://dx.doi.org/10.1155/2013/581754